

WHAT IS CLAIMED IS:

1. A packet receiver connected to a network for receiving communication packets sent from a packet transmitter and containing coded speech data via said network, decoding said communication packets, and outputting decoded speech data, said packet receiver comprising:

a packet memory circuit for temporarily storing received packets including the communication packets in a first-in first-out fashion to thereby form a queue;

a read start threshold setting circuit for setting, with respect to a length of the queue, a read start threshold at which the received packets should begin to be read out;

a read comparing circuit for determining whether or not the length of the queue has reached said read start threshold, and outputting a read command signal in accordance with a result of a decision; and

a read control circuit for causing, in response to said read command signal, the received packets to be read out of said packet memory circuit.

2. A packet receiver in accordance with claim 1, further comprising a dummy memory circuit storing a dummy packet containing exclusive speech data, wherein before a new receipt of the communication packets, said dummy memory circuit feeds said dummy packet to said packet memory circuit.

3. A packet receiver in accordance with claim 1, wherein by using a standard deviation that reflects a jitter distribution of the network and causes a receipt time of the communication packet to vary, said read start point setting circuit sets the read start threshold at a length of the queue that is three times to four times as great as said standard deviation.

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4. A packet receiver in accordance with 1, further comprising a diminishment control circuit for setting, with respect to the length of the queue, a discard start threshold and a discard end threshold at which the received packets should  
5 begin to be discarded and should end to be discarded, respectively, designating, when the length of said queue exceeds said discard start threshold, a received packet to be read out as a candidate to be discarded, estimating, based on sound/soundless information contained in said packet designated  
10 and the queue and/or an influence of said packet on quality of sound to be reproduced in an auditory aspect, and discarding or decoding said packet in accordance with a result of an estimation.

5. A packet receiver in accordance with claim 4, wherein said diminishment control circuit comprises:

a switching decision circuit for generating, when the length of the queue exceeds said discard start threshold, a  
5 signal to said read control circuit for reading the packet designated out of said packet memory circuit as the candidate, estimating the influence of said packet on sound quality, and generating a switching signal for selecting either one of discard processing and decode processing;

10 a switch for selecting the discard processing or the decode processing in accordance with said switching signal; and

a discarding circuit for executing the discard processing to thereby discard the received packet input via said switch;  
said switching decision circuit causing said switch to  
15 continuously select the discard processing up to said discharge end threshold set on the queue.

6. A packet receiver in accordance with claim 5, wherein said read start threshold, said discard start threshold and said discard end threshold are identical with each other.

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7. A packet receiver in accordance with claim 1, further comprising a packet monitoring circuit for monitoring the communication packets being sequentially received via the network and discarding, when any one of said communication  
5 packets exceeds a preselected allowable delay and/or is received in an inverse sequence, the one packet and/or feeding a preselected error packet to said packet memory circuit.

8. A packet receiver in accordance with claim 7, wherein said packet monitoring circuit comprises:

a time-out monitoring circuit for assigning a particular receipt limit time representative of the preselected allowable  
5 delay to each communication packet, and determining whether or not each communication packet arrives before said receipt limit time assigned thereto expires;

a sequence monitoring circuit for monitoring a sequence of receipt of the communication packets on the basis of  
10 information contained in said communication packets;

a discarding circuit for monitoring the communication packets and discarding any one of said communication packets that has arrived after the receipt limit time assigned to  
thereto; and

15 an error compensating circuit for feeding, when any one of the communication packets is discarded or received in an inverse sequence, the error packet to said packet memory circuit.

9. A packet receiver in accordance with claim 2, wherein by using a standard deviation that reflects a jitter distribution of the network and causes a receipt time of the communication packet to vary, said read start threshold setting  
5 circuit sets the read start threshold at a length of the queue that is three times to four times greater as great as said standard deviation.

10. A packet receiver in accordance with 9, further comprising a diminishment control circuit for setting, with respect to the length of the queue, a discard start threshold and a discard end threshold at which the received packets should  
5 begin to be discarded and should end to be discarded, respectively, designating, when the length of said queue exceeds said discard start threshold, a received packet to be read out as a candidate to be discarded, estimating, based on sound/soundless information contained in said packet designated  
10 and the queue, an influence of said packet on sound quality of sound to be reproduced in an auditory aspect, and discarding or decoding said packet in accordance with a result of an estimation.

11. A packet receiver in accordance with claim 10, wherein said diminishment control circuit comprises:

a switching decision circuit for generating, when the length of the queue exceeds said discard start threshold, a  
5 signal to said read control circuit for reading the packet designated out of said packet memory circuit as the candidate, estimating the influence of said packet on sound quality, and generating a switching signal for selecting either one of discard processing and decode processing;

10 a switch for selecting the discard processing or the decode processing in accordance with said switching signal; and

a discarding circuit for executing the discard processing to thereby discard the received packet input via said switch;

15 said switching decision circuit causing said switch to continuously select the discard processing up to said discharge end threshold set on the queue.

12. A packet receiver in accordance with claim 11, wherein said read start threshold, said discard start threshold and

said discard end threshold are identical with each other.

13. A packet receiver in accordance with claim 12, further comprising a packet monitoring circuit for monitoring communication packets being sequentially received via the network and discarding, when any one of said communication packets exceeds a preselected allowable delay and/or is received in an inverse sequence, the one packet and/or feeding a preselected error packet to said packet memory circuit.

14. A packet receiver in accordance with claim 13, wherein said packet monitoring circuit comprises:

a time-out monitoring circuit for setting a particular receipt limit time representative of the preselected allowable delay to each communication packet, and determining whether or not each communication packet arrives before said receipt limit time assigned thereto expires;

a sequence monitoring circuit for monitoring a sequence of receipt of the communication packets on the basis of information contained in said communication packets;

a discarding circuit for monitoring the communication packets and discarding any one of said communication packets that has arrived after the receipt limit time assigned to thereto; and

an error compensating circuit for feeding, when any one of the communication packets is discarded or received in an inverse sequence, the error packet to said packet memory circuit.

15. A method of receiving communication packets sent from a packet transmitter via a communication network and containing coded speech data via said network, decoding said communication packets, and outputting decoded speech data, said method comprising:

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a first step of setting, before temporarily storing received packets including the communication packets to thereby form a queue, a read start threshold at which said received packets should begin to be read out, a discard start threshold at which said received packets should begin to be discarded, and a discard end threshold at which said received packets should end to be discarded with respect to a length of said queue;

a second step of temporarily storing the received packets to thereby form the queue;

a third step of comparing the queue with said read start threshold and outputting, in accordance with a result of a comparison, a read command signal for reading out the received packets;

a fourth step of reading out the received packets in response to said read command signal and either one of a read request signal requesting the received packets to be decoded and a discard candidate read command signal output when the queue reaches said discard start threshold;

a fifth step of selecting either one of discarding and decoding of the received packets read out;

a sixth step of discarding, when the discarding is selected, at least one of the received packets from a head of the queue while determining whether or not the length of the queue has reached said discard end threshold; and

a seventh step of decoding, when the decoding is selected, the received packet read out.

16. A method in accordance with claim 15, wherein said read start threshold, said discard start threshold and said discard end threshold are identical with each other.

17. A method in accordance with claim 15, wherein said fifth step comprises designating, in response to said candidate

read command signal, the received packet read out as a candidate  
to be discarded, and estimating, based on sound/soundless  
5 information contained in said packet designated and the queue  
and/or an influence of said packet on sound quality of sound  
to be reproduced in an auditory aspect, and discarding or  
decoding said packet in accordance with a result of an  
estimation.

18. A method in accordance with claim 15, before a new  
receipt of the communication packet, a dummy packet containing  
exclusive speech data is fed and stored.

19. A method in accordance with claim 15, further  
comprising an eighth step of discarding, when any one of  
communication packets sequentially received via the network  
and monitored exceeds a preselected allowable delay and/or  
5 is received in an inverse sequence, the one communication packet  
and/or feeding a preselected error packet.

20. A method in accordance with claim 19, wherein said  
eighth step comprises:

a step of assigning a particular receipt limit time  
representative of the preselected allowable delay to each  
5 communication packet, and determining whether or not each  
communication packet arrives before said receipt limit time  
assigned thereto expires;

a step of monitoring a sequence of receipt of the  
communication packets on the basis of information contained  
10 in said communication packets;

a step of monitoring the communication packets and  
discarding any one of said communication packets that has  
arrived after the receipt limit time assigned to thereto; and

a step of feeding, when any one of the communication  
15 packets is discarded or received in an inverse sequence, the

error packet.

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